

# Agro-biodiversity in Nepal: Wise Insurance



Surya Nath Adhikari, Saraswati Adhikari, and their grandson with two rice plants they are cross-breeding.

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*By Marty Logan*

Teasing voices call to her from beyond camera range, but with one hand on her hip and another on a head-high rice plant, Saraswati Adhikari strikes a confident pose for a photographer. She has reason to be proud: 16 times the Nepali farmer and her husband Surya Nath have successfully improved local varieties of rice by cross-breeding, in the process helping to conserve agricultural biodiversity.

“I knew something about biodiversity conservation because I was trained in permaculture, but I didn’t know how to enhance local plant species and varieties,” says Surya Nath, who has farmed organically for more than 20 years on a scattering of small plots in the village of Begnas, located in the hills north of the city of Pokhara in West Nepal.

Almost a decade ago, Surya Nath heard that researchers were in the area setting up a project to examine how farmers grew six crops: rice, finger millet, taro, sponge gourd, pigeon pea, and cucumber. He approached them with a notion of crossing domestic rice with a wild variety. With their advice he embarked on the task, but “my vision was a bit weak and my hand was shaky and I worried that I would fail. So I taught my wife the practical aspects of crossing varieties.”

Today, that project has since ended, but its lessons continue to guide the Adhikaris and other Begnas farmers, who meet regularly to discuss the performance of their crops. And when they decide that a particular line could be improved by cross-breeding, they ask Saraswati to take out her scalpel and get to work.

## Exotic versus local varieties

The Pokhara-based non-governmental organization Local Initiatives for Biodiversity, Research and Development (LI-BIRD) introduced the project in Begnas nearly a decade ago. Begnas was one of two sites in Nepal chosen for a global project coordinated by IPGRI — the International Plant Genetic Resources Institute (now known as Bioversity International). Nepal's National Agricultural Research Council (NARC) was a national project partner; funding was provided by Canada's International Development Research Centre (IDRC) and the governments of Switzerland and the Netherlands. The project's aim was to help farmers find ways to conserve local varieties of crops, which had evolved in very specific ecosystems, in the face of a global trend of relying increasingly on "modern" varieties bred to survive in diverse growing conditions.

Nepal is still largely agrarian, with about 80 percent of the population of 27 million working in agriculture. Rice is the staple food.

When they first heard about the project, government scientists were skeptical that crops could be improved by focusing on local varieties (also known as landraces) rather than "exotic" varieties, says M.P. Upadhyay, NARC's National Project Coordinator.

"Until now we've been introducing improvements from outside. But now that the project has ended, we are saying, 'we can also develop local varieties that have traits that we know farmers like' ... It will have a huge psychological and scientific benefit," Upadhyay says.

"The basics (of agro-biodiversity) are local varieties and local knowledge. But we had forgotten this and focused on scientific resources. Now we're going back to the beginning," adds the scientist.

## Reality is in farmers' fields

According to IDRC Senior Program Specialist Liz Fajber, "Working together collaboratively with farmers and recognizing their knowledge is still a paradigm shift for many scientists. The need to focus on farmer priorities for research, and to work with them — both women and men — in the fields to develop new varieties needs to be the focus as opposed to lab or 'on station' research."

Earlier IDRC-supported research was also based on collaborative research and development between farmers and scientists, a process known as "participatory plant breeding (PPB)", adds Fajber. So when LI-BIRD, IPGRI, and NARC approached IDRC to participate, "it fit well with our overall priorities."



In the village of Begnas, researchers identified 69 rice varieties, some grown over large areas by most farmers but the majority cultivated in small areas for household use. Sixty-four local lines occupied two-thirds of the total rice-growing area. At the Bara District site, located south of

Kathmandu, 53 varieties were grown — 42 of them landraces — but modern varieties filled 84 percent of the rice fields, reflecting Bara's proximity to markets that supply seed, according to Upadhyay.

Over nine years, the project tallied many accomplishments: Farmers established crop registers to catalogue their communities' knowledge about local varieties. Using the "Four Cell Analysis," an analytical tool created for the project, farmers were able to determine if local lines were at risk of extinction and how they might improve a particular variety by cross-breeding. They created seed banks in case of shortages and organized into groups devoted to conserving landraces. At the policy level, project leaders helped the Nepal government establish a National Agro-biodiversity Committee and to include agro-biodiversity in its 10<sup>th</sup> five-year plan, in 2002.

Perhaps most importantly, farmers "bought into" the theory and devoted themselves to learning how to conserve and enhance local crop lines. It took four or five years before they were convinced, says LI-BIRD Executive Director Pratap Shrestha. "The farmers told us 'if we are to conserve local varieties it would be better if we cross and develop lines with the characteristics that we want'."

### Farmers register a first

One of the tipping points for farmers' participation in the Pokhara area was the example of *Pokhareli Jethobudho* rice. "We wanted to demonstrate to policymakers and farmers the importance of retaining biodiversity on-farm, but there was no evidence," says Shrestha. *Jethobudho* is prized for its soft texture and unique aroma and taste but it has problems with "lodging" (falling over) and is susceptible to neck blast disease. The quality of farmers' seed was also inconsistent, and, knowing this, traders would mix inferior rice into the *Jethobudho* that they sold.



In 1998, the project grew *Jethobudho* from seeds collected from 338 local farmers, and then chose 186 promising lines for further research. That sample was reduced to 46 lines, which were then sent to 150 local farmers to grow and evaluate. Based on their feedback, six lines were rated "outstanding" and will now become the basis of all future *Jethobudho* grown in the area. Millers and merchants are ready to pay a premium (6 % at the end of November 2006) on the improved variety.

The new *Jethobudho* has also been registered at the district agricultural office, the first time that Nepali farmers have registered a crop variety that they developed. "This opens the door to permit farming communities and groups to register their lines ... and utilize genetic resources for their benefit," says IPGRI scientist Bhuwon Sthapit.

In the project's final years, researchers focused on transforming the various activities into a system that communities could maintain themselves. "Now we have a PPB group. What we can do is cross-breed and then distribute the seeds to fellow farmers who can test them in their fields.

We also have a CBM (community biodiversity management) group with a cash fund that can be used in this process,” says Surya Nath Adhikari.

One of the project’s most important outcomes, says Sthapit, “is the self-belief of the communities that they can mobilize their different assets for their own development. Because of that, within the two sites, activities are continuing and they are attracting government and NGO support.”

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